

**Grade 5**

**Unit 2**

**Volume**

**Student Workbook**

**Name:**



Name \_\_\_\_\_

Date \_\_\_\_\_

1. Use your centimeter cubes to build the figures pictured below on centimeter grid paper. Find the total volume of each figure you built, and explain how you counted the cubic units. Be sure to include units.

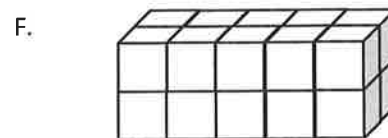
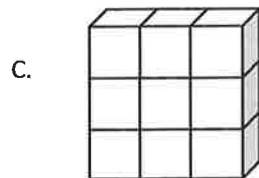
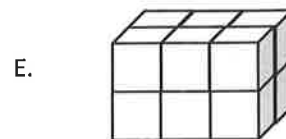
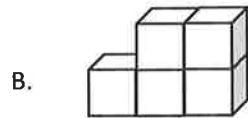
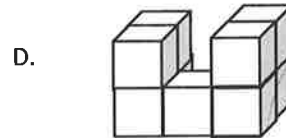
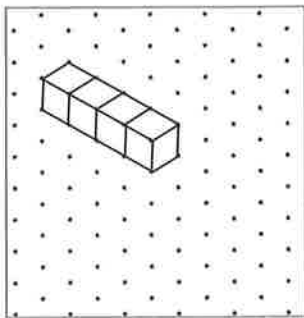


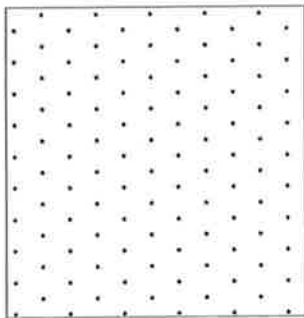
Figure	Volume	Explanation
A		
B		
C		
D		
E		
F		

2. Build 2 different structures with the following volumes using your cubic units. Then draw one of the figures on the dot paper. One example has been drawn for you.

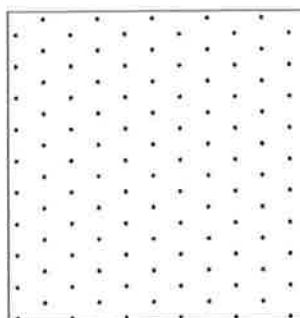
a. 4 cubic units



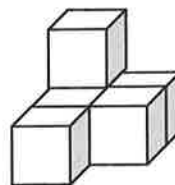
b. 7 cubic units



c. 8 cubic units



3. Joyce says that the figure below, made of 1-cm cubes, has a volume of 5 cubic centimeters. Explain her mistake.



4. Imagine that Joyce made the second layer of her structure identical to the first. What would its volume be then? Explain how you know.

Name \_\_\_\_\_

Date \_\_\_\_\_

1. The following solids are made up of 1-cm cubes. Find the total volume of each figure, and write it in the chart below.

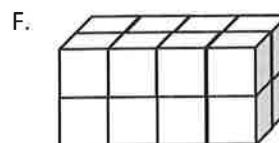
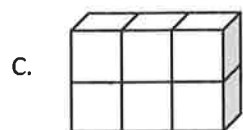
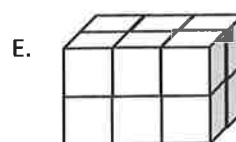
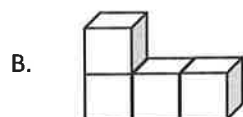
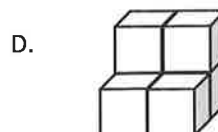
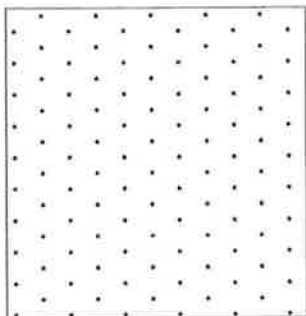


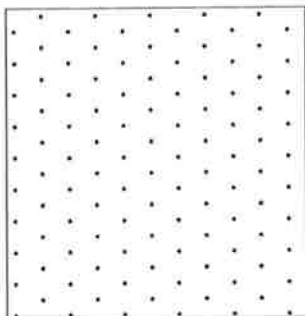
Figure	Volume	Explanation
A		
B		
C		
D		
E		
F		

5. Draw the figures on the dot paper with the given number of unit cubes.

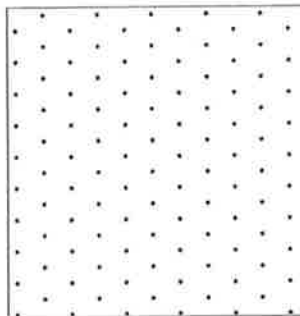
a. 3 cubic units



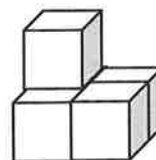
b. 6 cubic units



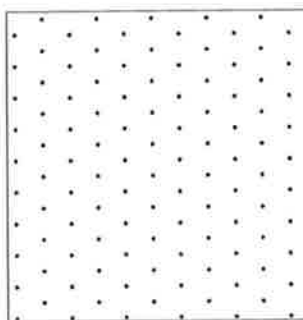
c. 12 cubic units

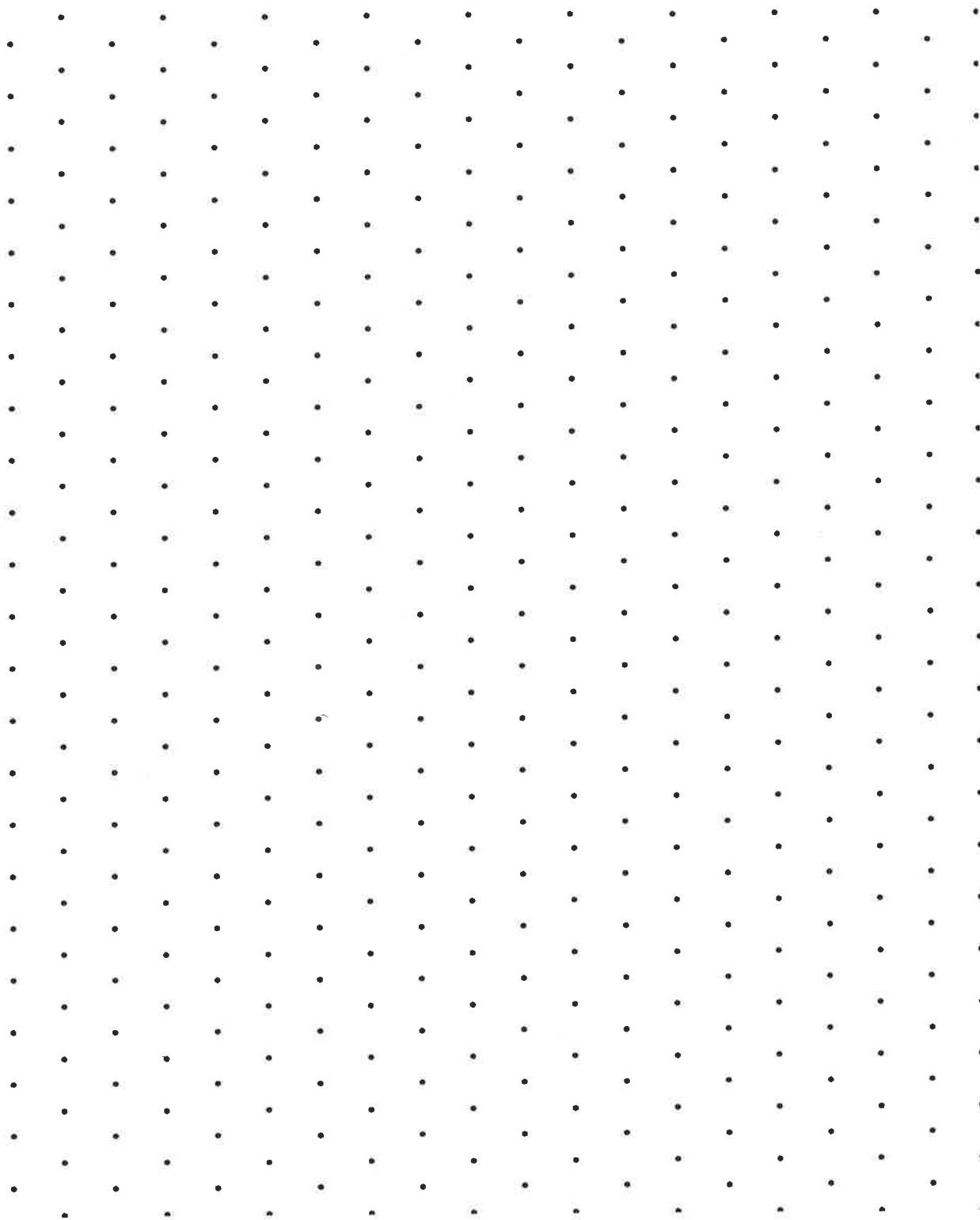


6. John built and drew a structure that has a volume of 5 cubic centimeters. His little brother tells him he made a mistake because he only drew 4 cubes. Help John explain to his brother why his drawing is accurate.



7. Draw another figure below that represents a structure with a volume of 5 cubic centimeters.





**Lesson 1:**  
**Date:**

Explore volume by building with and counting unit cubes.  
1/10/14

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5.A.14



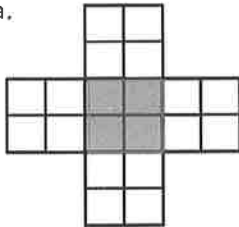


Name \_\_\_\_\_

Date \_\_\_\_\_

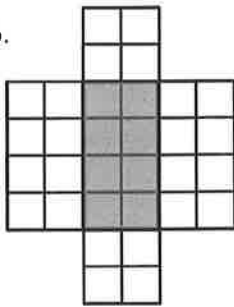
1. Shade the following figures on centimeter grid paper. Cut and fold each to make 3 open boxes, taping them so they hold their shapes. Pack each box with cubes. Write how many cubes fill the box.

a.



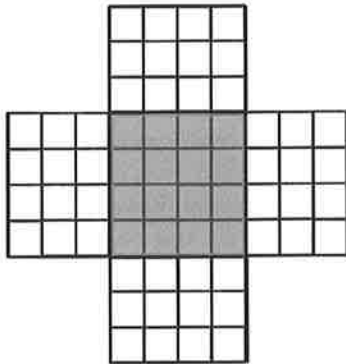
Number of cubes: \_\_\_\_\_

b.



Number of cubes: \_\_\_\_\_

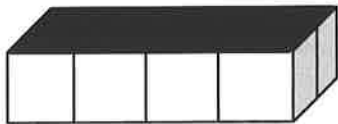
c.



Number of cubes: \_\_\_\_\_

2. Predict how many centimeter cubes will fit in each box and briefly explain your prediction. Use cubes to find the actual volume. (The figures are not drawn to scale.)

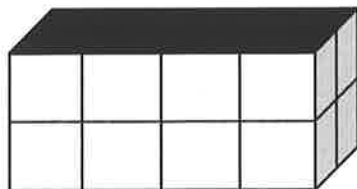
a.



Prediction: \_\_\_\_\_

Actual: \_\_\_\_\_

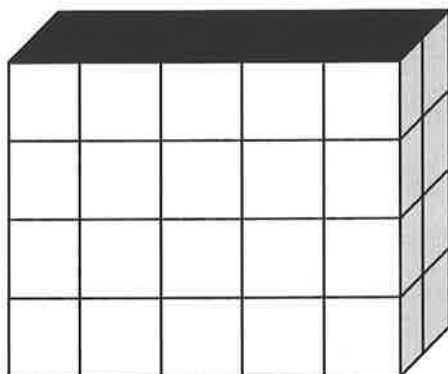
b.



Prediction: \_\_\_\_\_

Actual: \_\_\_\_\_

c.



Prediction: \_\_\_\_\_

Actual: \_\_\_\_\_

3. Cut out the net in the template and fold it into a cube. Predict the number of 1-centimeter cubes that would be required to fill it. Test your prediction using as few cubes as possible. What did you discover?

Prediction: \_\_\_\_\_

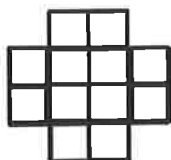
What I discovered: \_\_\_\_\_

Name \_\_\_\_\_

Date \_\_\_\_\_

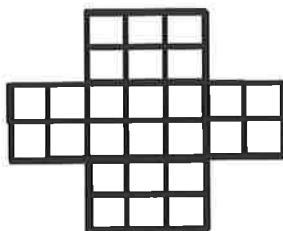
1. Make the following boxes on centimeter grid paper. Cut and fold each to make 3 open boxes, taping them so they hold their shapes. How many cubes would fill each box? Explain how you found the number.

a.



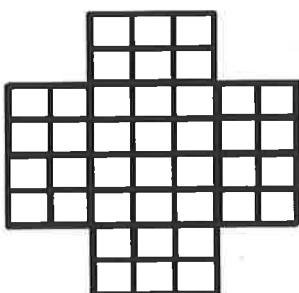
Number of cubes: \_\_\_\_\_

b.



Number of cubes: \_\_\_\_\_

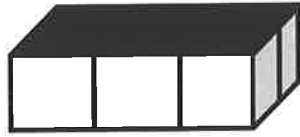
c.



Number of cubes: \_\_\_\_\_

2. How many centimeter cubes would fit inside each box? Explain your answer using words and diagrams on the box. (The figures are not drawn to scale; the first box is 3 centimeters across and 2 centimeters wide.)

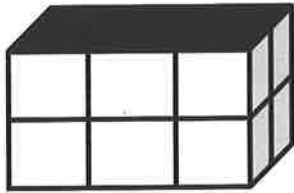
a.



Number of cubes: \_\_\_\_\_

Explanation:

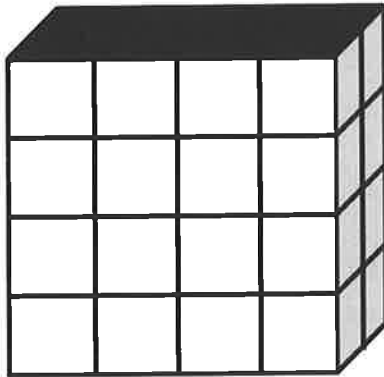
b.



Number of cubes: \_\_\_\_\_

Explanation:

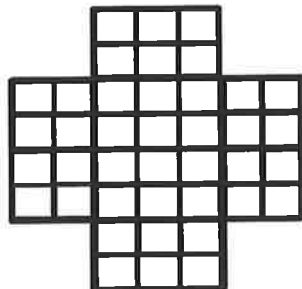
c.

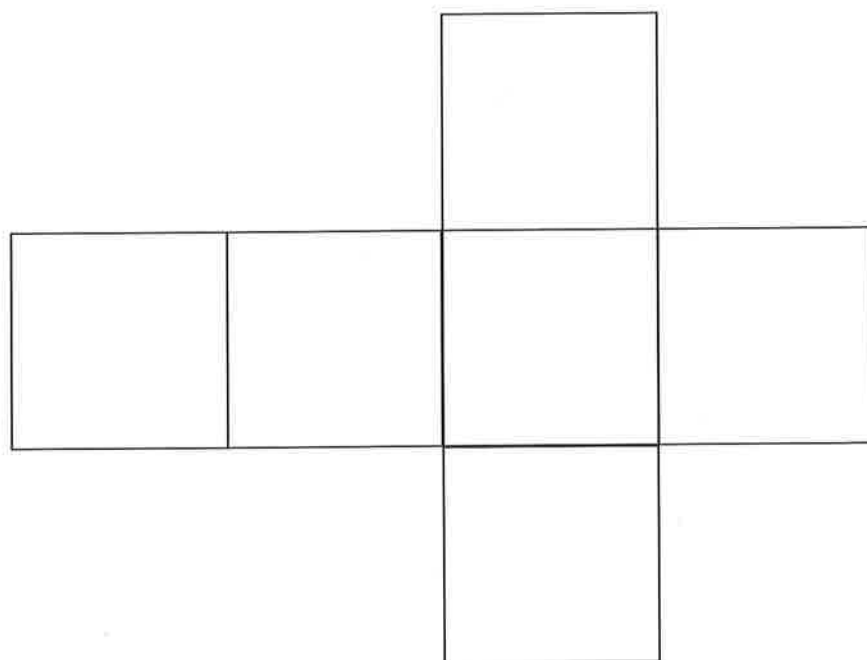
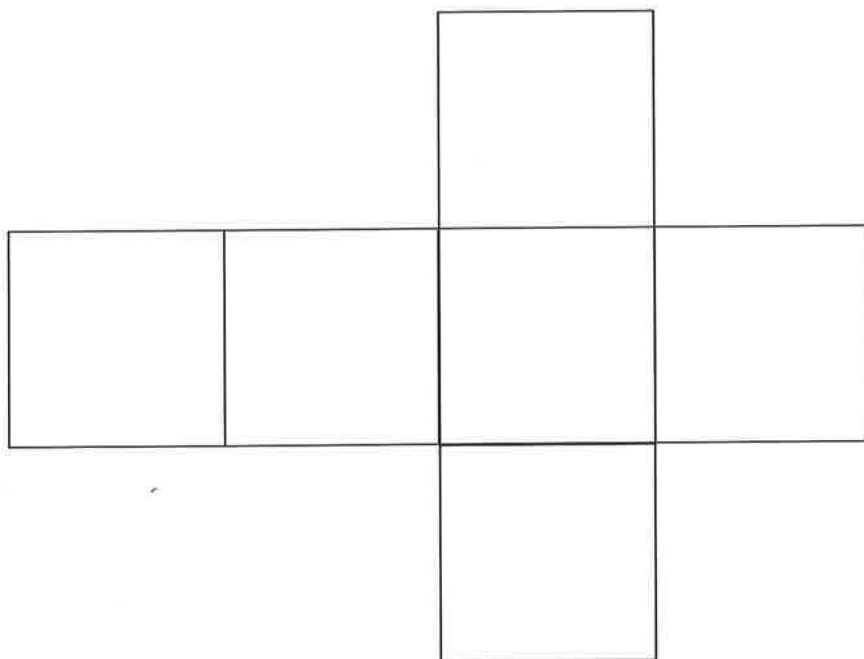


Number of cubes: \_\_\_\_\_

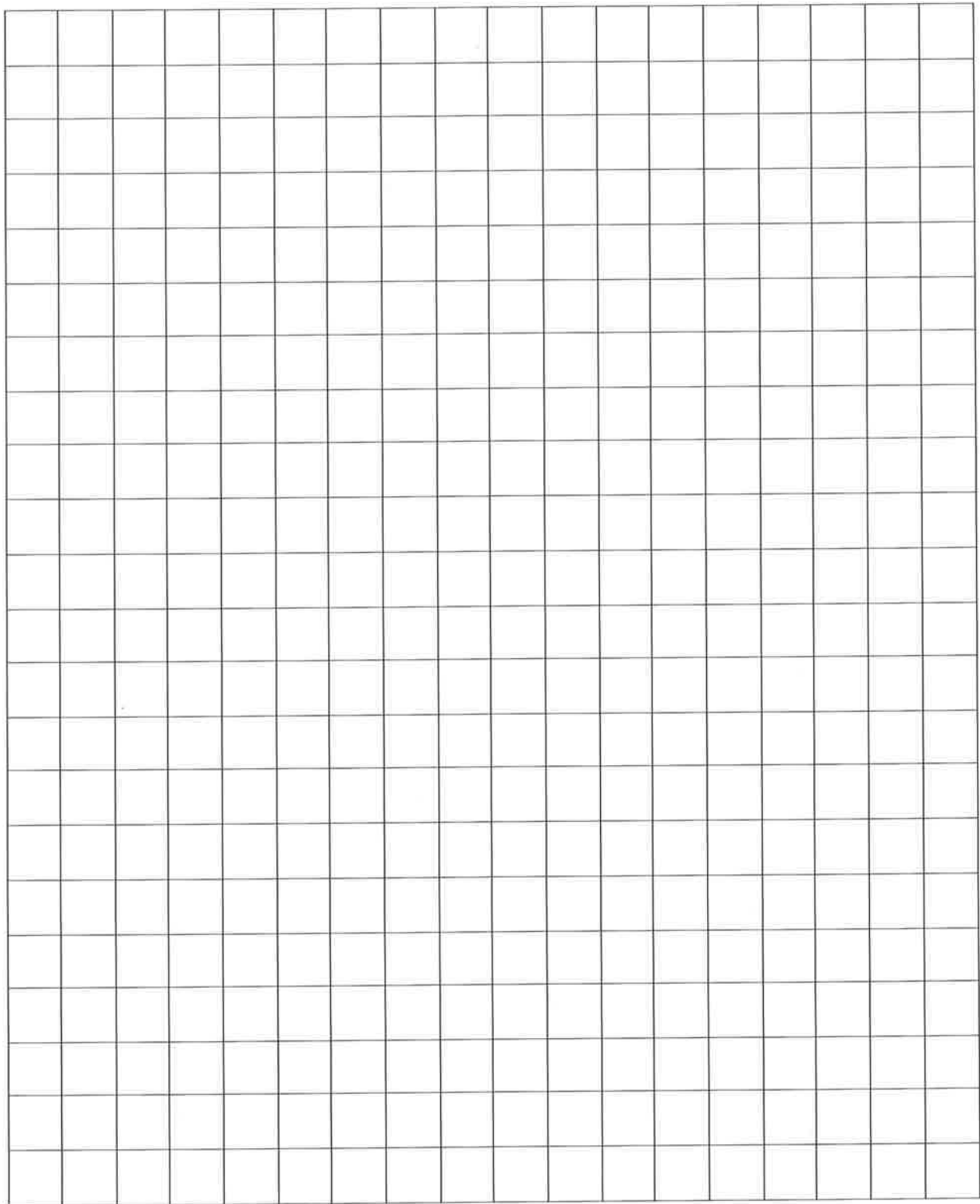
Explanation:

3. The box pattern below holds 24 1-cm cubes. Draw two different box patterns that would hold the same number of cubes.







**Centimeter Grid**





**A**

# Correct \_\_\_\_\_

Solve.					
1	$\frac{1}{5} \times 2 =$		23	$\frac{5}{6} \times 12 =$	
2	$\frac{1}{5} \times 3 =$		24	$\frac{1}{3} \times 15 =$	
3	$\frac{1}{5} \times 4 =$		25	$\frac{2}{3} \times 15 =$	
4	$4 \times \frac{1}{5} =$		26	$15 \times \frac{2}{3} =$	
5	$\frac{1}{8} \times 3 =$		27	$\frac{1}{5} \times 15 =$	
6	$\frac{1}{8} \times 5 =$		28	$\frac{2}{5} \times 15 =$	
7	$\frac{1}{8} \times 7 =$		29	$\frac{4}{5} \times 15 =$	
8	$7 \times \frac{1}{8} =$		30	$\frac{3}{5} \times 15 =$	
9	$3 \times \frac{1}{10} =$		31	$15 \times \frac{3}{5} =$	
10	$7 \times \frac{1}{10} =$		32	$18 \times \frac{1}{6} =$	
11	$\frac{1}{10} \times 7 =$		33	$18 \times \frac{5}{6} =$	
12	$4 \div 2 =$		34	$\frac{5}{6} \times 18 =$	
13	$4 \times \frac{1}{2} =$		35	$24 \times \frac{1}{4} =$	
14	$6 \div 3 =$		36	$\frac{3}{4} \times 24 =$	
15	$\frac{1}{3} \times 6 =$		37	$32 \times \frac{1}{8} =$	
16	$10 \div 5 =$		38	$32 \times \frac{3}{8} =$	
17	$10 \times \frac{1}{5} =$		39	$\frac{5}{8} \times 32 =$	
18	$\frac{1}{3} \times 9 =$		40	$32 \times \frac{7}{8} =$	
19	$\frac{2}{3} \times 9 =$		41	$\frac{5}{9} \times 54 =$	
20	$\frac{1}{4} \times 8 =$		42	$63 \times \frac{7}{9} =$	
21	$\frac{3}{4} \times 8 =$		43	$56 \times \frac{3}{7} =$	
22	$\frac{1}{6} \times 12 =$		44	$\frac{6}{7} \times 49 =$	

B

Improvement \_\_\_\_\_

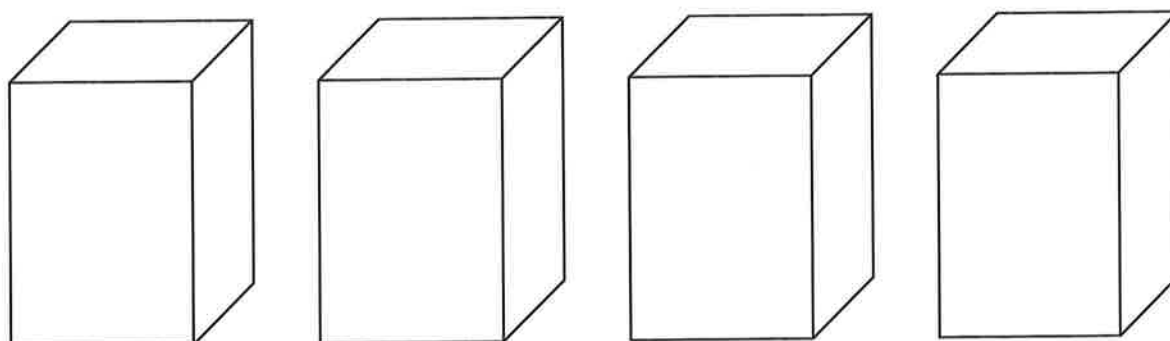
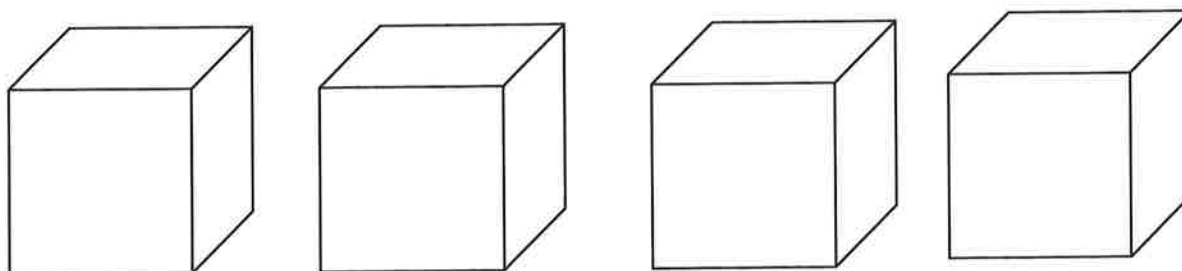
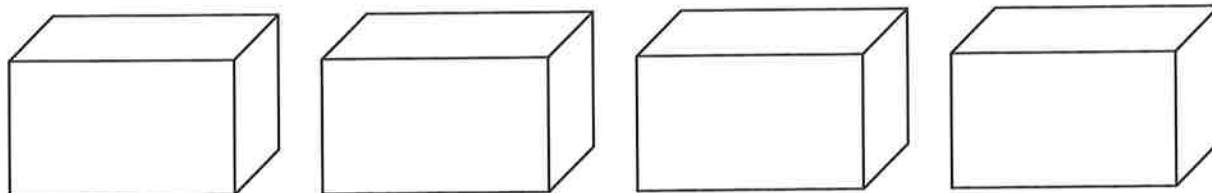
# Correct \_\_\_\_\_

1	Solve. $\frac{1}{7} \times 2 =$		23	$\frac{3}{4} \times 8 =$	
2	$\frac{1}{7} \times 3 =$		24	$\frac{1}{5} \times 15 =$	
3	$\frac{1}{7} \times 4 =$		25	$\frac{2}{5} \times 15 =$	
4	$4 \times \frac{1}{7} =$		26	$\frac{4}{5} \times 15 =$	
5	$\frac{1}{10} \times 3 =$		27	$\frac{3}{5} \times 15 =$	
6	$\frac{1}{10} \times 7 =$		28	$15 \times \frac{3}{5} =$	
7	$\frac{1}{10} \times 9 =$		29	$\frac{1}{3} \times 15 =$	
8	$9 \times \frac{1}{10} =$		30	$\frac{2}{3} \times 15 =$	
9	$3 \times \frac{1}{8} =$		31	$15 \times \frac{2}{3} =$	
10	$5 \times \frac{1}{8} =$		32	$24 \times \frac{1}{6} =$	
11	$\frac{1}{8} \times 5 =$		33	$24 \times \frac{5}{6} =$	
12	$10 \div 5 =$		34	$\frac{5}{6} \times 24 =$	
13	$10 \times \frac{1}{5} =$		35	$20 \times \frac{1}{4} =$	
14	$9 \div 3 =$		36	$\frac{3}{4} \times 20 =$	
15	$\frac{1}{3} \times 9 =$		37	$24 \times \frac{1}{8} =$	
16	$10 \div 2 =$		38	$24 \times \frac{3}{8} =$	
17	$10 \times \frac{1}{2} =$		39	$\frac{5}{8} \times 24 =$	
18	$\frac{1}{3} \times 6 =$		40	$24 \times \frac{7}{8} =$	
19	$\frac{2}{3} \times 6 =$		41	$\frac{5}{9} \times 63 =$	
20	$\frac{1}{6} \times 12 =$		42	$54 \times \frac{7}{9} =$	
21	$\frac{5}{6} \times 12 =$		43	$49 \times \frac{3}{7} =$	
22	$\frac{1}{4} \times 8 =$		44	$\frac{6}{7} \times 56 =$	

Name \_\_\_\_\_

Date \_\_\_\_\_

Use these rectangular prisms to record the layers that you count.





Name \_\_\_\_\_

Date \_\_\_\_\_

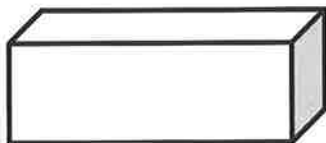
1. Use the prisms to find the volume.

- Build the rectangular prism pictured below to the left with your cubes, if necessary.
- Decompose it into layers in three different ways, and show your thinking on the blank prisms.
- Complete the missing information in the table.

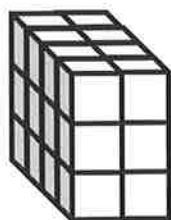
a.



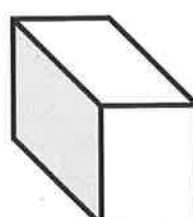
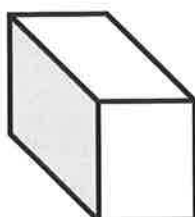
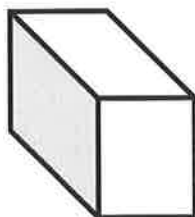
Number of Layers	Number of Cubes in Each Layer	Volume of the Prism
		cubic cm
		cubic cm
		cubic cm



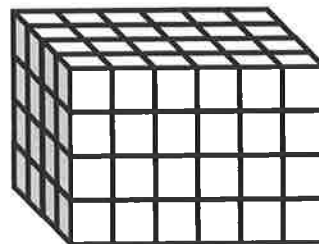
b.



Number of Layers	Number of Cubes in Each Layer	Volume of the Prism
		cubic cm
		cubic cm
		cubic cm



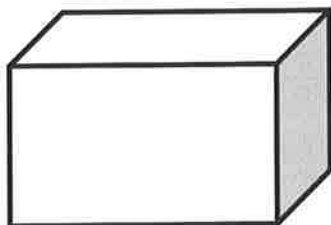
2. Josh and Jonah were finding the volume of the prism to the right. The boys agree that 4 layers can be added together to find the volume. Josh says that he can see on the end of the prism that each layer will have 16 cubes in it. Jonah says that each layer has 24 cubes in it. Who is right? Explain how you know using words, numbers, and/or pictures.



3. Marcos makes a prism 1 inch by 5 inches by 5 inches. He then decides to create layers equal to his first one. Fill in the chart below, and explain how you know the volume of each new prism.

Number of Layers	Volume	Explanation
2		
4		
7		

4. Imagine the rectangular prism below is 6 meters long, 4 meters tall, and 2 meters wide. Draw horizontal lines to show how the prism could be decomposed into layers that are 1 meter in height.



It has \_\_\_\_\_ layers from bottom to top.

Each layer contains \_\_\_\_\_ cubic units.

The volume of this prism is \_\_\_\_\_.

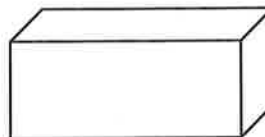
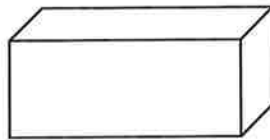
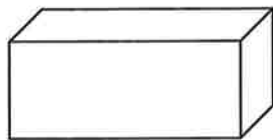
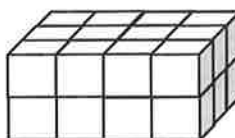
Name \_\_\_\_\_

Date \_\_\_\_\_

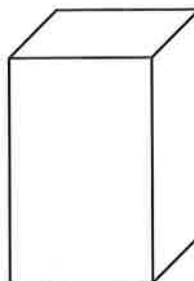
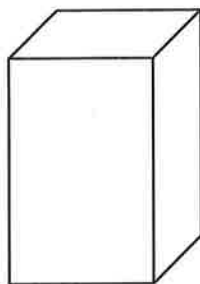
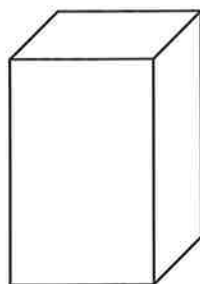
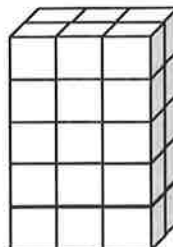
1. Use the prisms to find the volume.

- The rectangular prisms pictured below were constructed with 1-cm cubes
- Decompose each prism into layers in three different ways, and show your thinking on the blank prisms.
- Complete each table

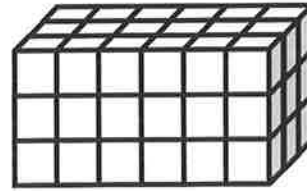
Number of Layers	Number of Cubes in Each Layer	Volume of the Prism
		cubic cm
		cubic cm
		cubic cm



Number of Layers	Number of Cubes in Each Layer	Volume of the Prism
		cubic cm
		cubic cm
		cubic cm



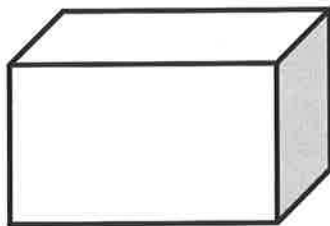
2. Stephen and Chelsea want to increase the volume of this prism by 72 cubic centimeters. Chelsea wants to add eight layers and Stephen says they only need to add four layers. Their teacher tells them they are both correct. Explain how this is possible.



3. Juliana makes a prism 4 inches across and 4 inches wide, but only 1 inch tall. She then decides to create layers equal to her first one. Fill in the chart below and explain how you know the volume of each new prism.

Number of Layers	Volume	Explanation
3		
5		
7		

4. Imagine the rectangular prism below is 4 meters long, 3 meters tall, and 2 meters wide. Draw horizontal lines to show how the prism could be decomposed into layers that are 1 meter in height.



It has \_\_\_\_\_ layers from left to right.

Each layer contains \_\_\_\_\_ cubic units.

The volume of this prism is \_\_\_\_\_.

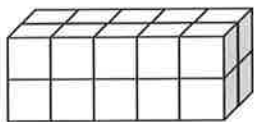


Name \_\_\_\_\_

Date \_\_\_\_\_

1. Each rectangular prism is built from centimeter cubes. State the dimensions and find the volume.

a.



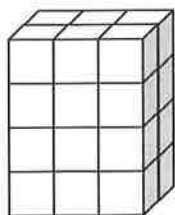
Length: \_\_\_\_\_ cm

Width: \_\_\_\_\_ cm

Height: \_\_\_\_\_ cm

Volume: \_\_\_\_\_  $\text{cm}^3$

b.



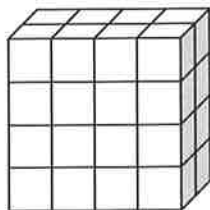
Length: \_\_\_\_\_ cm

Width: \_\_\_\_\_ cm

Height: \_\_\_\_\_ cm

Volume: \_\_\_\_\_  $\text{cm}^3$

c.



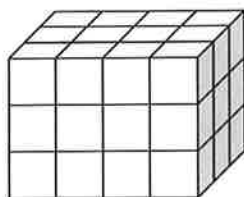
Length: \_\_\_\_\_ cm

Width: \_\_\_\_\_ cm

Height: \_\_\_\_\_ cm

Volume: \_\_\_\_\_  $\text{cm}^3$

d.



Length: \_\_\_\_\_ cm

Width: \_\_\_\_\_ cm

Height: \_\_\_\_\_ cm

Volume: \_\_\_\_\_  $\text{cm}^3$

2. Write a multiplication sentence that you could use to calculate the volume for each rectangular prism in Problem 1. Include the units in your sentences.

a. \_\_\_\_\_

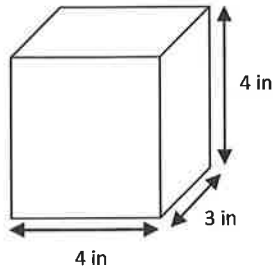
b. \_\_\_\_\_

c. \_\_\_\_\_

d. \_\_\_\_\_

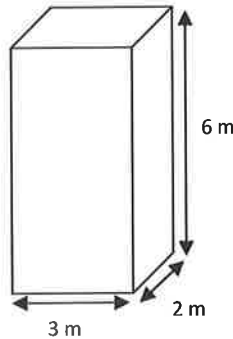
3. Calculate the volume of each rectangular prism. Include the units in your number sentences.

a.



$V =$  \_\_\_\_\_

b.

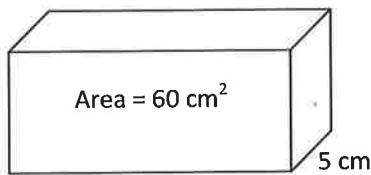


$V =$  \_\_\_\_\_

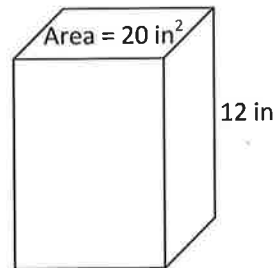
4. Tyron is constructing a box in the shape of a rectangular prism to store his baseball cards. It has a length of 10 centimeters, a width of 7 centimeters, and a height of 8 centimeters. What is the volume of the box?

5. Aaron says more information is needed to find the volume of the prisms. Explain why Aaron is mistaken, and calculate the volume of the prisms.

a.



b.

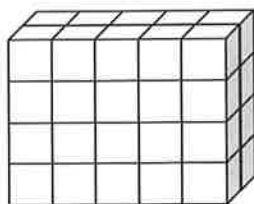


Name \_\_\_\_\_

Date \_\_\_\_\_

1. Each rectangular prism is built from centimeter cubes. State the dimensions and find the volume.

a.



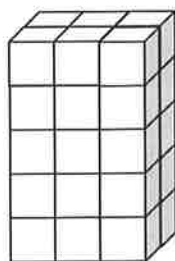
Length: \_\_\_\_\_ cm

Width: \_\_\_\_\_ cm

Height: \_\_\_\_\_ cm

Volume: \_\_\_\_\_  $\text{cm}^3$

b.



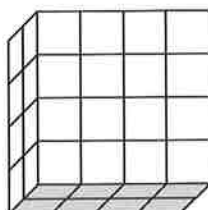
Length: \_\_\_\_\_ cm

Width: \_\_\_\_\_ cm

Height: \_\_\_\_\_ cm

Volume: \_\_\_\_\_  $\text{cm}^3$

c.



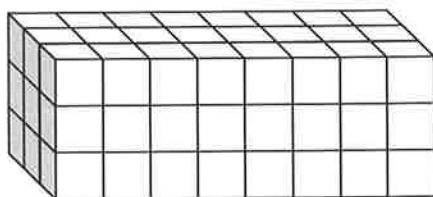
Length: \_\_\_\_\_ cm

Width: \_\_\_\_\_ cm

Height: \_\_\_\_\_ cm

Volume: \_\_\_\_\_  $\text{cm}^3$

d.



Length: \_\_\_\_\_ cm

Width: \_\_\_\_\_ cm

Height: \_\_\_\_\_ cm

Volume: \_\_\_\_\_  $\text{cm}^3$

2. Write a multiplication sentence that you could use to calculate the volume for each rectangular prism in Problem 1. Include the units in your sentences.

a. \_\_\_\_\_

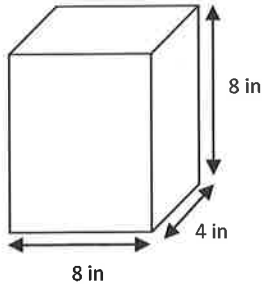
b. \_\_\_\_\_

c. \_\_\_\_\_

d. \_\_\_\_\_

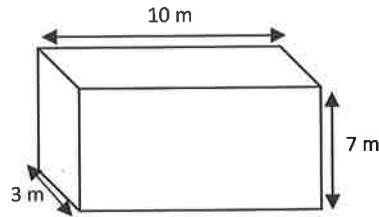
3. Calculate the volume of each rectangular prism. Include the units in your number sentences.

a.



Volume: \_\_\_\_\_

b.



Volume: \_\_\_\_\_

4. Mrs. Johnson is constructing a box in the shape of a rectangular prism to store clothes for the summer. It has a length of 28 inches, a width of 24 inches, and a height of 30 inches. What is the volume of the box?

5. Calculate the volume of each rectangular prism using the information that is provided.

a. Face area: 56 square meters, height: 4 meters.

b. Face area: 169 square inches, height: 14 inches.

Name \_\_\_\_\_

Date \_\_\_\_\_

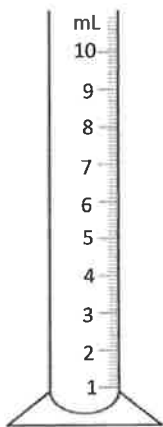
- Determine the volume of two boxes on the table using cubes and then confirm by measuring and multiplying.

Box Number	Number of Cubes Packed	Measurements			Volume
		Length	Width	Height	

- Using the same boxes from Problem 1, record the amount of liquid that your box can hold.

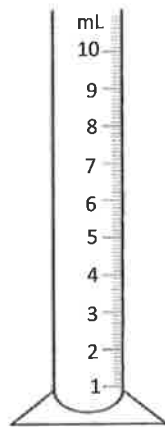
Box Number	Liquid the Box Can Hold
	mL
	mL

- Shade to show the water in the beaker.



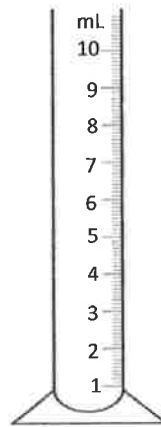
At first:

\_\_\_\_\_ mL



After 1 mL water added:

\_\_\_\_\_ mL

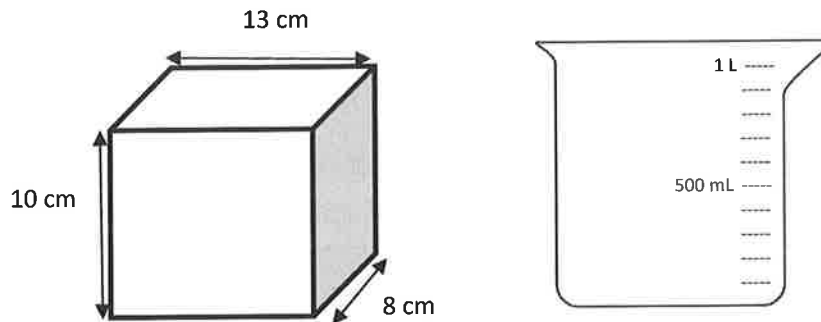


After 1 cm cube added:

\_\_\_\_\_ mL

4. What conclusion can you draw about 1 cubic centimeter and 1 mL?

5. The tank, shaped like a rectangular prism, is filled to the top with water.



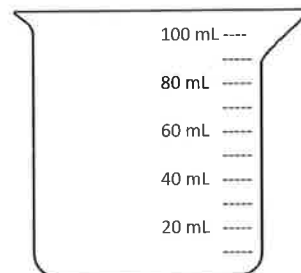
Will the beaker hold all the water in the box? If yes, how much more will the beaker hold? If not, how much more will the cube hold than the beaker? Explain how you know.

6. A rectangular fish tank measures 26 cm by 20 cm by 18 cm. The tank is filled with water to a depth of 15 cm.
- What is the volume of the water in mL?
  - How many liters is that?
  - How many more mL of water will be needed to fill the tank to the top? Explain how you know.
  - A rectangular container is 25 cm long and 20 cm wide. If it holds 1 liter of water when full, what is its height?

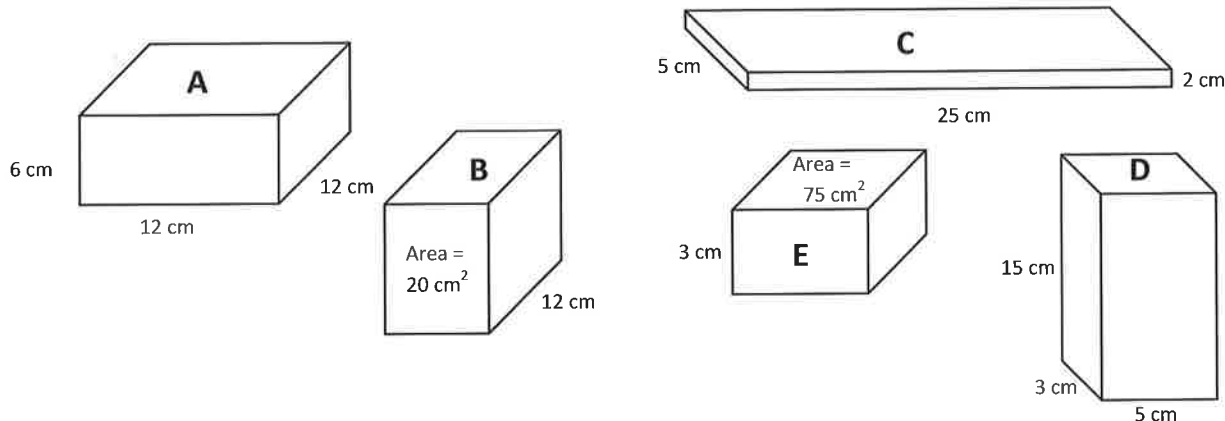
Name \_\_\_\_\_

Date \_\_\_\_\_

1. Johnny filled a container with 30 centimeter cubes. Shade the beaker to show how much water the container will hold. Explain how you know.



2. A beaker contains 250 mL of water. Jack wants to pour the water into a container that will hold the water. Which of the containers pictured below could he use? Explain your choices.



3. On the back of this paper, describe the details of the activities you did in class today. Include what you learned about cubic centimeters and milliliters. Give an example of a problem you solved with an illustration.



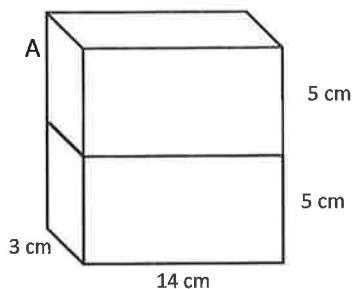


Name \_\_\_\_\_

Date \_\_\_\_\_

1. Find the total volume of the figures and record your solution strategy.

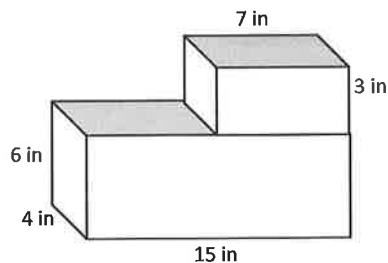
a.



Volume: \_\_\_\_\_

Solution Strategy:

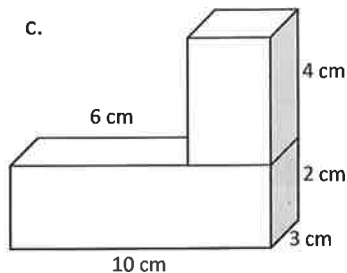
b.



Volume: \_\_\_\_\_

Solution Strategy:

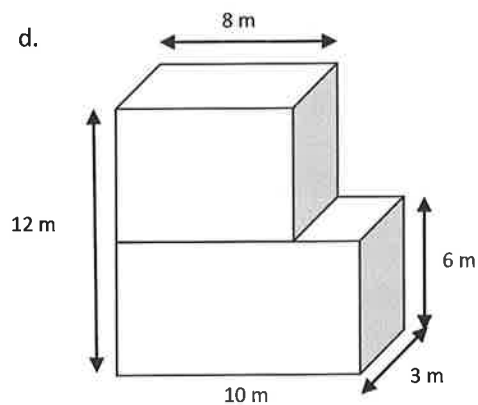
c.



Volume: \_\_\_\_\_

Solution Strategy:

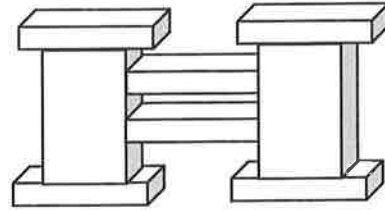
d.



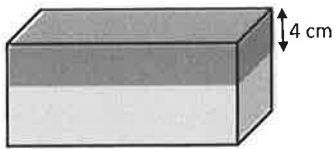
Volume: \_\_\_\_\_

Solution Strategy:

2. A sculpture (pictured below) is made of two sizes of rectangular prisms. One size measures 13 in by 8 in by 2 in. The other size measures 9 in by 8 in by 18 in. What is the total volume of the sculpture?



3. The combined volume of two identical cubes is 128 cubic centimeters. What is the side length of each cube?
4. A rectangular tank with a base area of  $24 \text{ cm}^2$  is filled with water and oil to a depth of 9 cm. The oil and water separate into two layers when the oil rises to the top. If the thickness of the oil layer is 4 cm, what is the volume of the water?



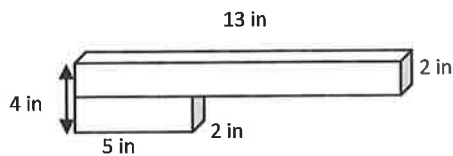
5. Two rectangular prisms have a combined volume of 432 cubic feet. Prism A has half the volume of Prism B.
- What is the volume of Prism A? Prism B?
  - If Prism A has a base area of  $24 \text{ ft}^2$ , what is the height of Prism A?
  - If Prism B's base is  $\frac{2}{3}$  the area of Prism A's base, what is the height of Prism B?

Name \_\_\_\_\_

Date \_\_\_\_\_

1. Find the total volume of the figures and record your solution strategy.

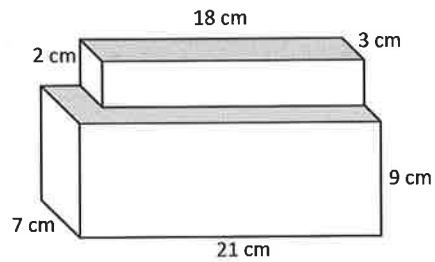
a.



Volume: \_\_\_\_\_

Solution Strategy:

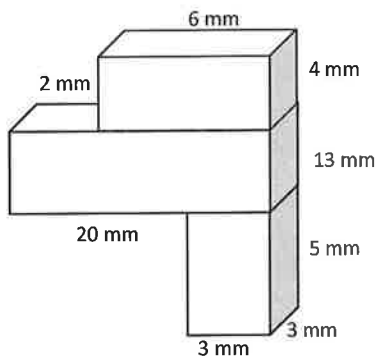
b.



Volume: \_\_\_\_\_

Solution Strategy:

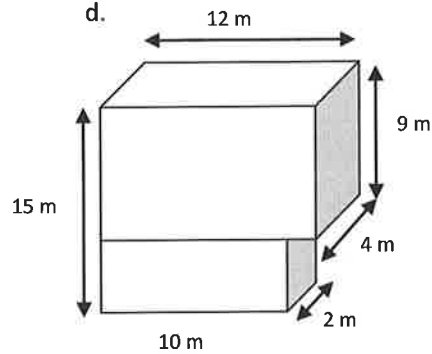
c.



Volume: \_\_\_\_\_

Solution Strategy:

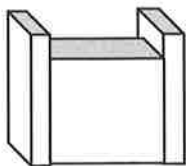
d.



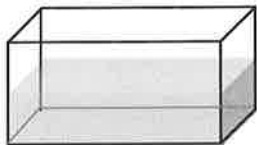
Volume: \_\_\_\_\_

Solution Strategy:

2. A planting box (pictured below) is made of two sizes of rectangular prisms. One type of prism measures 3 inches by 6 inches by 14 inches. The other type measures 18 inches by 9 inches by 10 inches. What is total volume of three such boxes?



3. The combined volume of two identical cubes is 250 cubic centimeters. What is the measure of one cube's edge?
4. A fish tank has a base area of  $45 \text{ cm}^2$  and is filled with water to a depth of 12 cm. If the height of the tank is 25 cm, how much more water will be needed to fill the tank to the brim?



5. Three rectangular prisms have a combined volume of 518 cubic feet. Prism A has one-third the volume of Prism B, and Prisms B and C have equal volume. What is the volume of each prism?

**A**

# Correct \_\_\_\_\_

Multiply, but don't simplify.

1	$\frac{1}{2} \times \frac{1}{2} =$		23	$\frac{2}{5} \times \frac{5}{3} =$	
2	$\frac{1}{2} \times \frac{1}{3} =$		24	$\frac{3}{5} \times \frac{5}{2} =$	
3	$\frac{1}{2} \times \frac{1}{4} =$		25	$\frac{1}{3} \times \frac{1}{3} =$	
4	$\frac{1}{2} \times \frac{1}{7} =$		26	$\frac{1}{3} \times \frac{2}{3} =$	
5	$\frac{1}{7} \times \frac{1}{2} =$		27	$\frac{2}{3} \times \frac{2}{3} =$	
6	$\frac{1}{3} \times \frac{1}{2} =$		28	$\frac{2}{3} \times \frac{3}{2} =$	
7	$\frac{1}{3} \times \frac{1}{3} =$		29	$\frac{2}{3} \times \frac{4}{3} =$	
8	$\frac{1}{3} \times \frac{1}{6} =$		30	$\frac{2}{3} \times \frac{5}{3} =$	
9	$\frac{1}{3} \times \frac{1}{5} =$		31	$\frac{3}{2} \times \frac{3}{5} =$	
10	$\frac{1}{5} \times \frac{1}{3} =$		32	$\frac{3}{4} \times \frac{1}{5} =$	
11	$\frac{1}{5} \times \frac{2}{3} =$		33	$\frac{3}{4} \times \frac{4}{5} =$	
12	$\frac{2}{5} \times \frac{2}{3} =$		34	$\frac{3}{4} \times \frac{5}{5} =$	
13	$\frac{1}{4} \times \frac{1}{3} =$		35	$\frac{3}{4} \times \frac{6}{5} =$	
14	$\frac{1}{4} \times \frac{2}{3} =$		36	$\frac{1}{4} \times \frac{6}{5} =$	
15	$\frac{3}{4} \times \frac{2}{3} =$		37	$\frac{1}{7} \times \frac{1}{7} =$	
16	$\frac{1}{6} \times \frac{1}{3} =$		38	$\frac{1}{8} \times \frac{3}{5} =$	
17	$\frac{5}{6} \times \frac{1}{3} =$		39	$\frac{5}{6} \times \frac{1}{4} =$	
18	$\frac{5}{6} \times \frac{2}{3} =$		40	$\frac{3}{4} \times \frac{3}{4} =$	
19	$\frac{5}{4} \times \frac{2}{3} =$		41	$\frac{2}{3} \times \frac{6}{6} =$	
20	$\frac{1}{5} \times \frac{1}{5} =$		42	$\frac{3}{4} \times \frac{6}{2} =$	
21	$\frac{2}{5} \times \frac{2}{5} =$		43	$\frac{7}{8} \times \frac{7}{9} =$	
22	$\frac{2}{5} \times \frac{3}{5} =$		44	$\frac{7}{12} \times \frac{9}{8} =$	

**B**

Improvement \_\_\_\_\_

# Correct \_\_\_\_\_

Multiply, but don't simplify.

1	$\frac{1}{2} \times \frac{1}{3} =$		23	$\frac{3}{5} \times \frac{5}{4} =$	
2	$\frac{1}{2} \times \frac{1}{4} =$		24	$\frac{4}{5} \times \frac{5}{3} =$	
3	$\frac{1}{2} \times \frac{1}{5} =$		25	$\frac{1}{4} \times \frac{1}{4} =$	
4	$\frac{1}{2} \times \frac{1}{9} =$		26	$\frac{1}{4} \times \frac{3}{4} =$	
5	$\frac{1}{9} \times \frac{1}{2} =$		27	$\frac{3}{4} \times \frac{3}{4} =$	
6	$\frac{1}{5} \times \frac{1}{2} =$		28	$\frac{3}{4} \times \frac{4}{3} =$	
7	$\frac{1}{5} \times \frac{1}{3} =$		29	$\frac{3}{4} \times \frac{5}{4} =$	
8	$\frac{1}{5} \times \frac{1}{7} =$		30	$\frac{3}{4} \times \frac{6}{4} =$	
9	$\frac{1}{5} \times \frac{1}{3} =$		31	$\frac{4}{3} \times \frac{4}{6} =$	
10	$\frac{1}{3} \times \frac{1}{5} =$		32	$\frac{2}{3} \times \frac{1}{5} =$	
11	$\frac{1}{3} \times \frac{2}{5} =$		33	$\frac{2}{3} \times \frac{4}{5} =$	
12	$\frac{2}{3} \times \frac{2}{5} =$		34	$\frac{2}{3} \times \frac{5}{5} =$	
13	$\frac{1}{3} \times \frac{1}{4} =$		35	$\frac{2}{3} \times \frac{6}{5} =$	
14	$\frac{1}{3} \times \frac{3}{4} =$		36	$\frac{1}{3} \times \frac{6}{5} =$	
15	$\frac{2}{3} \times \frac{3}{4} =$		37	$\frac{1}{9} \times \frac{1}{9} =$	
16	$\frac{1}{3} \times \frac{1}{6} =$		38	$\frac{1}{5} \times \frac{3}{8} =$	
17	$\frac{2}{3} \times \frac{1}{6} =$		39	$\frac{3}{4} \times \frac{1}{6} =$	
18	$\frac{2}{3} \times \frac{5}{6} =$		40	$\frac{2}{3} \times \frac{2}{3} =$	
19	$\frac{3}{2} \times \frac{3}{4} =$		41	$\frac{3}{4} \times \frac{8}{8} =$	
20	$\frac{1}{5} \times \frac{1}{5} =$		42	$\frac{2}{3} \times \frac{6}{3} =$	
21	$\frac{3}{5} \times \frac{3}{5} =$		43	$\frac{6}{7} \times \frac{8}{9} =$	
22	$\frac{3}{5} \times \frac{4}{5} =$		44	$\frac{7}{12} \times \frac{8}{7} =$	

Name \_\_\_\_\_

Date \_\_\_\_\_

Geoffrey builds rectangular planters.

1. Geoffrey's first planter is 8 feet long and 2 feet wide. The container is filled with soil to a height of 3 feet in the planter. What is the volume of soil in the planter? Explain your work using a diagram.
2. Geoffrey wants to grow some tomatoes in four large planters. He wants each planter to have a volume of 320 cubic feet, but he wants them all to be different. Show four different ways Geoffrey can make these planters, and draw diagrams with the planters' measurements on them.

Planter A	Planter B
Planter C	Planter D

3. Geoffrey wants to make one planter that extends from the ground to just below his back window. The window starts 3 feet off the ground. If he wants the planter to hold 36 cubic feet of soil, name one way he could build the planter so it is not taller than 3 feet. Explain how you know.
4. After all of this gardening work, Geoffrey decides he needs a new shed to replace the old one. His current shed is a rectangular prism that measures 6 feet long by 5 feet wide by 8 feet high. He realizes he needs a shed with 480 cubic feet of storage.
- a. Will he achieve his goal if he doubles each dimension? Why or why not?
- b. If he wants to keep the height the same, what could the other dimensions be for him to get the volume he wants?
- c. If he uses the dimensions in Part (b), what could be the area of the new shed's floor?



Name \_\_\_\_\_

Date \_\_\_\_\_

Wren makes some rectangular display boxes.

1. Wren's first display box is 6 inches long, 9 inches wide, and 4 inches high. What is the volume of the display box? Explain your work using a diagram.
2. Wren wants to put some artwork into three large display boxes. She knows they all need a volume of 60 cubic inches, but she wants them all to be different. Show three different ways Wren can make these boxes by drawing diagrams and labeling the measurements.

Shadow Box A	Shadow Box B
Shadow Box C	

3. Wren wants to build a box to organize her scrapbook supplies. She has a stencil set that is 12 inches wide that needs to lay flat in the bottom of the box. The supply box must also be no taller than 2 feet. Name one way she could build a toy box with a volume of 72 cubic inches.
4. After all of this organizing, Wren decides she also needs more storage for her soccer equipment. Her current storage box measures 1 foot long by 2 feet wide by 2 feet high. She realizes she needs to replace it with a box with 12 cubic feet of storage, so she doubles the width.
- a. Will she achieve her goal if she does this? Why or why not?
- b. If she wants to keep the height the same, what could the other dimensions be for a 12-cubic-foot storage box?
- c. If she uses the dimensions in Part (b), what is the area of the new storage box's floor?
- d. How has the area of the bottom in her new storage box changed? Explain how you know.

Name \_\_\_\_\_

Date \_\_\_\_\_

Using the box patterns, construct a sculpture containing at least 5 but not more than 7 rectangular prisms that meets the following requirements in the table below.

1.	My sculpture has 5 to 7 rectangular prisms. Number of prisms: _____	
2.	Each prism is labeled with a letter, dimensions, and volume.	
	Prism A _____ by _____ by _____ Volume _____ Prism B _____ by _____ by _____ Volume _____ Prism C _____ by _____ by _____ Volume _____ Prism D _____ by _____ by _____ Volume _____ Prism E _____ by _____ by _____ Volume _____ Prism ____ by _____ by _____ Volume _____ Prism ____ by _____ by _____ Volume _____	
3.	Prism D has $\frac{1}{2}$ the volume of prism ____.	Prism D Volume = _____ Prism ____ Volume = _____
4.	Prism E has $\frac{1}{3}$ the volume of prism ____.	Prism E Volume = _____ Prism ____ Volume = _____
5.	The total volume of all the prisms is 1,000 cubic centimeters or less.	Total volume: _____ Show calculations:



Name \_\_\_\_\_

Date \_\_\_\_\_

1. I have a prism with the dimensions of 6 cm by 12 cm by 15 cm. Calculate the volume of the prism, then give the dimensions of three different prisms that have  $\frac{1}{3}$  of the volume.

	Length	Width	Height	Volume
Original Prism	6 cm	12 cm	15 cm	
Prism 1				
Prism 2				
Prism 3				

2. Sunni's bedroom has the dimensions of 11 ft by 10 ft by 10 ft. Her den has the same height, but double the volume. Give two sets of the possible dimensions of the den and the volume of the den.



Name \_\_\_\_\_

Date \_\_\_\_\_

I reviewed project number \_\_\_\_\_

Use the rubric below to evaluate your friend's project. Ask questions and measure the parts to determine whether he or she has all the required elements. Respond to the prompt in italics in the third column. The final column can be used to write something you find interesting about that element if you like.

Space is provided beneath the rubric for your calculations.

	Requirement	Element present? (✓)	Specifics of Element	Notes
1	Sculpture has 5 to 7 prisms.		<i># of prisms:</i>	
2	All prisms are labeled with a letter.		<i>Write letters used:</i>	
3	All prisms have correct dimensions with units written on the top.		<i>List any prisms with incorrect dimensions or units:</i>	
4	All prisms have correct volume with units written on top.		<i>List any prism with incorrect dimensions or units:</i>	
5	Prism D has $\frac{1}{2}$ the volume of another prism.		<i>Record on next page:</i>	
6	Prism E has $\frac{1}{3}$ the volume of another prism.		<i>Record on next page:</i>	
7	The total volume of all the parts together is 1,000 cubic units or less.		<i>Total volume:</i>	

Calculations:



Lesson 9:

Date:

Apply concepts and formulas of volume to design a sculpture using rectangular prisms within given parameters.  
1/10/14

engage<sup>ny</sup>

5.B.73

8. Measure the dimensions of each prism. Calculate the volume of each prism and the total volume. Record that information in the table below. If your measurements or volume differ from those listed on the project, put a star by the prism label in the table below and record on the rubric.

Prism	Dimensions		Volume
A	by	by	
B	by	by	
C	by	by	
D	by	by	
E	by	by	
	by	by	
	by	by	

9. Prism D's volume is  $\frac{1}{2}$  that of Prism \_\_\_\_\_.  
Show calculations below.

10. Prism E's volume is  $\frac{1}{3}$  that of Prism \_\_\_\_\_.  
Show calculations below.

11. Total volume of sculpture: \_\_\_\_\_.  
Show calculations below.



Name \_\_\_\_\_

Date \_\_\_\_\_

1. Find three rectangular prisms around your house. Describe the item you are measuring (cereal box, tissue box, etc.), then measure each dimension to the nearest whole inch and calculate the volume.

## a. Rectangular Prism A

Item: \_\_\_\_\_

Height: \_\_\_\_\_ inches

Length: \_\_\_\_\_ inches

Width: \_\_\_\_\_ inches

Volume: \_\_\_\_\_ cubic inches

## b. Rectangular Prism B

Item: \_\_\_\_\_

Height: \_\_\_\_\_ inches

Length: \_\_\_\_\_ inches

Width: \_\_\_\_\_ inches

Volume: \_\_\_\_\_ cubic inches

## c. Rectangular Prism C

Item: \_\_\_\_\_

Height: \_\_\_\_\_ inches

Length: \_\_\_\_\_ inches

Width: \_\_\_\_\_ inches

Volume: \_\_\_\_\_ cubic inches



Lesson 9:

Date: \_\_\_\_\_

Apply concepts and formulas of volume to design a sculpture using rectangular prisms within given parameters.  
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engage<sup>ny</sup>

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# Exit Slips

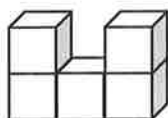


Name \_\_\_\_\_

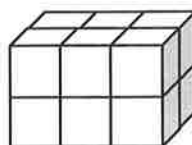
Date \_\_\_\_\_

1. What is the volume of the figures pictured below?

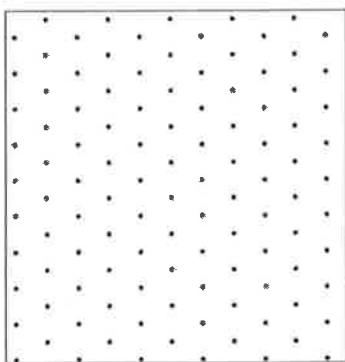
A.



B.



2. Draw a picture of a figure with a volume of 3 cubic units on the dot paper.

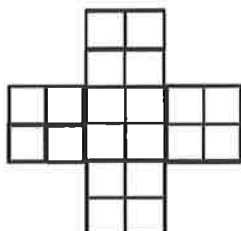




Name \_\_\_\_\_

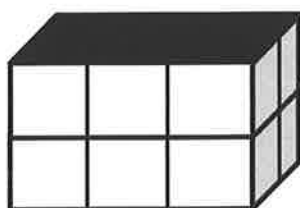
Date \_\_\_\_\_

1. If this net were to be folded into a box, how many cubes would fill it?



Number of cubes: \_\_\_\_\_

2. Predict how many centimeter cubes will fit in the box, and briefly explain your prediction. Use cubes to find the actual volume. (The figure is not drawn to scale.)



Prediction: \_\_\_\_\_

Actual: \_\_\_\_\_





Name \_\_\_\_\_

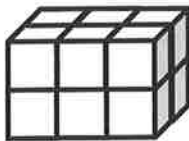
Date \_\_\_\_\_

1. Use unit cubes to build the figure to the right and fill in the missing information.

Number of layers: \_\_\_\_\_

Number of cubes in each layer: \_\_\_\_\_

Volume: \_\_\_\_\_ cubic centimeters

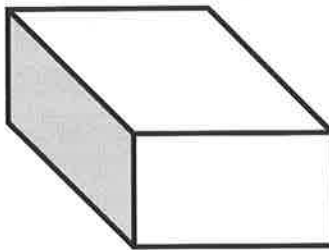


2. This prism measures 3 units by 4 units by 2 units. Draw the layers as indicated.

Number of layers: 4

Number of cubic units in each layer: 6

Volume: \_\_\_\_\_ cubic centimeters



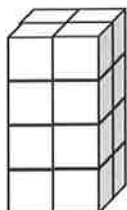


Name \_\_\_\_\_

Date \_\_\_\_\_

Calculate the volume of each prism.

a.



Length: \_\_\_\_\_ mm

Width: \_\_\_\_\_ mm

Height: \_\_\_\_\_ mm

Volume: \_\_\_\_\_  $\text{mm}^3$ 

Write the multiplication sentence that shows how you calculated the volume. Be sure to include the units.

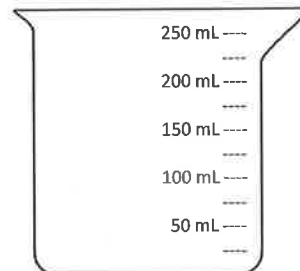
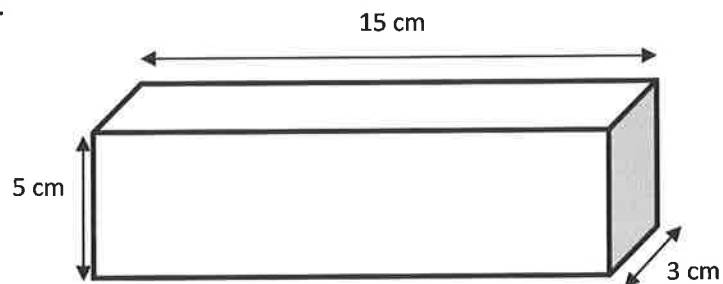
- b. A rectangular prism has a top face with an area of  $20 \text{ ft}^2$  and a height of 5 ft. What is the volume of this rectangular prism?



Name \_\_\_\_\_

Date \_\_\_\_\_

1.



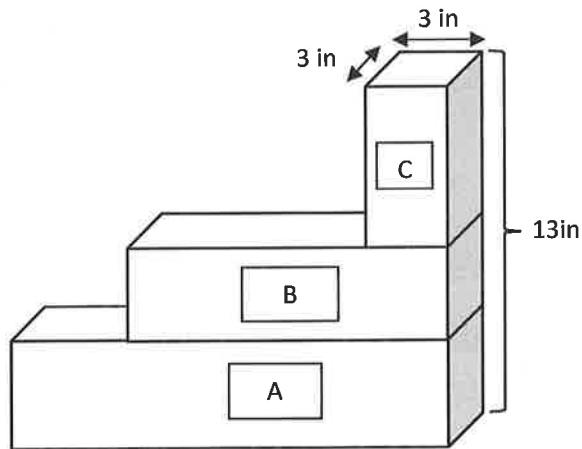
- Find the volume of the prism.
- Shade the beaker to show how much liquid would fill the box.



Name \_\_\_\_\_

Date \_\_\_\_\_

1. Find the total volume of soil in the three planters. Planter A is 15 inches by 3 inches by 3 inches. Planter B is 9 inches by 3 inches by 4 inches.







Name \_\_\_\_\_

Date \_\_\_\_\_

1. A storage shed is a rectangular prism and has dimensions of 6 meters by 5 meters by 12 meters. If Jean were to double these dimensions, she believes she would only double the volume. Is she correct? Explain why or why not. Include a drawing in your explanation.

**Lesson 7:**

Solve word problems involving the volume of rectangular prisms with whole number edge lengths.

**Date:**

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Name \_\_\_\_\_

Date \_\_\_\_\_

1. Sketch a rectangular prism that has a volume of 36 cubic cm. Label the dimensions of each side on the prism. Fill in the blanks that follow.

Height: \_\_\_\_\_ cm

Length: \_\_\_\_\_ cm

Width: \_\_\_\_\_ cm

Volume: \_\_\_\_\_ cubic cm



Name \_\_\_\_\_

Date \_\_\_\_\_

1. A student designed this sculpture. Using the dimensions on the sculpture find the dimensions of each rectangular prism. Then, calculate the volume of prism.

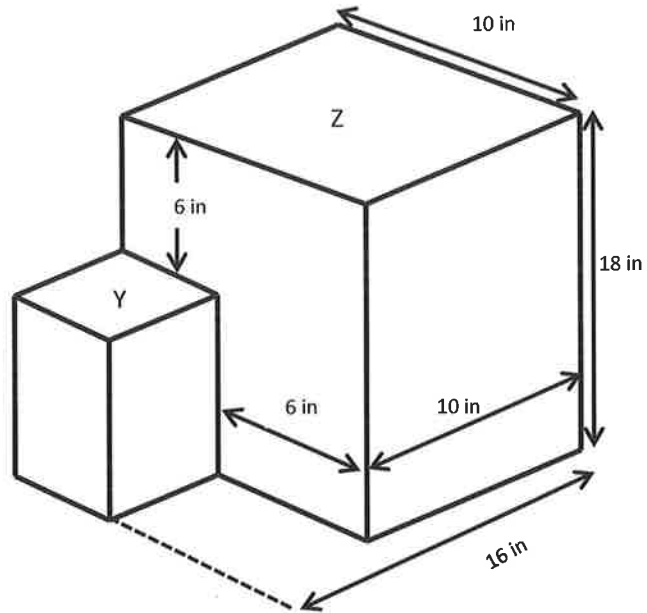
a. Rectangular Prism Y

Height: \_\_\_\_\_ inches

Length: \_\_\_\_\_ inches

Width: \_\_\_\_\_ inches

Volume: \_\_\_\_\_ cubic inches



b. Rectangular Prism Z

Height: \_\_\_\_\_ inches

Length: \_\_\_\_\_ inches

Width: \_\_\_\_\_ inches

Volume: \_\_\_\_\_ cubic inches

- c. Find the total volume of the sculpture. Label the answer.